REMARKS/ARGUMENTS

Reconsideration of the application in view of the following remarks is respectfully requested.

Status of Claims

Claims 1-26 are pending in the application, with claim 1 being the only independent claim.

Overview of the Office Action

Claims 1-5 and 22 stand rejected under 35 U.S.C. §102(b) as anticipated by U.S. Patent No. 5,822,347 (*Yokogawa*).

Claim 1 stands rejected under 35 U.S.C. §102(e) as anticipated by U.S. Patent No. 6,855,570 (*Takatani*).

Claims 1-5, 9-13, 22 and 24-26 stand rejected under 35 U.S.C. §103(a) as unpatentable over U.S. Patent No. 5,717,226 (*Lee*) in view of U.S. Patent No. 6,346,719 (*Udagawa*).

Claim 6 stands rejected under 35 U.S.C. §103(a) as unpatentable over *Lee* in view of *Udagawa* and further in view of U.S. Patent No. 6,693,352 (*Huang*).

Claims 7, 8 and 23 stand rejected under 35 U.S.C. §103(a) as unpatentable over *Lee* in view of U.S. Patent Application Publication No. 2003/0059972 (*Ikeda*).

Claims 14-21 stand rejected under 35 U.S.C. §103(a) as unpatentable over *Lee* in view of *Udagawa* and further in view of JP 2001036131 (*Udagawa II*).

Summary of Subject Matter Disclosed in the Specification

The following descriptive details are based on the specification. They are provided only for the convenience of the Examiner as part of the discussion presented herein, and are not intended to argue limitations which are unclaimed.

The specification of the present application discloses a light-emitting diode chip having an epitaxial semiconductor layer sequence with an active zone that emits electromagnetic radiation, and an electrical contact structure. The electrical contact structure comprises a radiation-transmissive electrical current expansion layer which contains ZnO, and an electrical connection layer. The current expansion layer is applied directly on a cladding layer of the semiconductor layer sequence on which the connection layer is also applied directly (see paragraphs [0007], [0035] and [0037] of the original specification).

The connection layer is electrically conductively connected to the current expansion layer and has a junction with the cladding layer. When an electrical voltage is applied to the light-emitting diode chip in the operating direction, the junction between the connection layer and the cladding layer is not electrically conductive or is only poorly electrically conductive so that the entire, or virtually the entire, current flows via the current expansion layer into the semiconductor layer sequence (see paragraph [0007] of the original specification), rather than directly from the connection layer to the cladding layer to which the connection layer is directly applied.

During operation, as a result of this construction less current is injected into the region directly below the connection layer. Therefore, no light, or at least less light, is generated in this region and absorbed by the connection layer (see paragraph [0008] of the original specification).

Arguments

Independent Claim 1

§102(b) rejection in view of *Yokogawa*

Claim 1 is not anticipated by *Yokogawa* because *Yokogawa* does not disclose, either expressly or inherently, each and every element set forth in claim 1.

In particular, *Yokogawa* does not teach or suggest that a radiation-transmissive electrical current expansion layer is applied directly on a cladding layer. In the Office Action (pages 2 and 3), the Examiner has interpreted the polycrystalline ZnO layer (1019) of *Yokogawa* as an electrical current expansion layer. This interpretation is incorrect.

In *Yokogawa*, the polycrystalline ZnO layer (1019) is not in fact an electrical current expansion layer as recited in applicants' claim 1. On the contrary, the polycrystalline ZnO layer (1019) of *Yokogawa* is a burying layer, which is used for constricting current so that current injection is confined to the region directly below the stripe-like contact layer (1018) (see, e.g., abstract; col. 4, lines 46-49; col. 8, lines 40-46 of *Yokogawa*). Such current confinement is necessary for the type of laser disclosed by *Yokogawa* in order to realize a sufficiently high current density -- i.e., a current density which is higher than the threshold current density needed for lasing. This structure, however, operates opposite the way in which applicants' claimed light emitting diode structure functions.

As a current-constricting burying layer, the polycrystalline ZnO layer (1019) is not electrically conductive and therefore does not and cannot function as the claimed electrical current expansion layer. *Yokogawa's* use of ZnO in a current-constricting layer teaches away from using a polycrystalline ZnO in an electrical expansion layer (1019), as in the present invention. *Yokogawa* therefore, neither teaches nor suggests a structure in which a radiation-transmissive electrical current expansion layer is applied directly on a cladding layer.

In contrast, claim 1 of the present application expressly recites a radiation-transmissive electrical current expansion layer that is applied directly on a cladding layer.

Claim 1 recites not merely a ZnO layer, but an electrical current expansion layer that contains ZnO. The ZnO layer of *Yokogawa* exhibits behavior opposite that of applicants' ZnO layer -- i.e. current constriction as contrasted with current expansion. Thus, the recited functionality of applicants' claimed ZnO layer is not and cannot fairly be considered inherent in *Yokogawa's* disclosure of a ZnO layer. *Yokogawa* does not anticipate applicants' claim 1 structure.

In view of the foregoing, withdrawal of the §102(b) rejection of claim 1 as anticipated by *Yokogawa* is respectfully requested.

§102(e) rejection in view of *Takatani*

Claim 1 is similarly not anticipated by *Takatani* which fails to disclose, either expressly or inherently, each and every element set forth in claim 1.

In particular, *Takatani* does not teach or suggest applicants' claim 1 recitation that a radiation-transmissive electrical current expansion layer is applied directly on a cladding layer. In the Office Action, the Examiner has interpreted the layer (110) of *Takatani* as an electrical current expansion layer. *Takatani*, however, explicitly describes this layer (110) as a buried layer, a dielectric (i.e. electrically insulating) film used for constricting current to a region immediately under a ridge portion of the active layer (106) (see abstract; col. 2, lines 51-54; col. 6, lines 18-20 and 52-56; Fig. 5 of *Takatani*). The buried layer (110) of *Takatani* is therefore not electrically conductive and accordingly does not and cannot function as an electrical current expansion layer. *Takatani* quite simply does not teach or suggest that a radiation-transmissive

electrical current expansion layer is applied directly on a cladding layer, as is recited in applicants' claim 1.

In view of the foregoing, withdrawal of the §102(b) rejection of claim 1 as anticipated by *Takatani* is respectfully requested.

§103(a) rejection over *Lee* in view of *Udagawa*

Applicants further submit that claim 1 is patentable over *Lee* in view of *Udagawa* because the combination of *Lee* and *Udagawa* fails to teach or suggest all of the limitations of claim 1.

The combination of *Lee* and *Udagawa* fails to teach or suggest applicants' claim 1 recitation that both an electrical current expansion layer and a connection layer are applied directly on a cladding layer. As discussed in detail in applicant's previous two responses, which are incorporated by reference herein, in *Lee* the electrical current expansion layer (i.e., the transparent electrode 35) is not applied directly on the same cladding layer (33) on which the connection layer (i.e., the metal 36) is directly applied. Rather, there is an intermediate layer (i.e., the p-type contact layer 34) located between the electrical current expansion layer (35) and the cladding layer (33) (see Fig. 3b of *Lee*). The electrical current expansion layer (35) of Lee is therefore applied directly on the intermediate layer (34), while the connection layer (36) is applied directly on the cladding layer (33) (see Fig. 3b of *Lee*) – i.e. on different layers.

Lee accordingly fails to teach the recited limitation "the current expansion layer is applied directly on a cladding layer of the semiconductor layer sequence and comprises a window, in which the connection layer is applied directly on said cladding layer of the semiconductor layer sequence" in claim 1.

Udagawa does not supply that which is missing from *Lee* because *Udagawa* does not teach or suggest that both a connection layer and the electrical current expansion layer (306) are applied directly on the same cladding layer (305c). In *Udagawa*, only the electrical current expansion layer (306) is applied directly on the cladding layer (305c) (see col. 7, lines 24-26; Fig. 5 of *Udagawa*). An electrode (307) is then applied directly on the electrical current expansion layer (360) (see col. 7, lines 34-37; Fig. 5 of *Udagawa*). Therefore, the electrode (307) of *Udagawa* is not applied directly on the cladding layer (305c).

Like Lee, therefore, *Udagawa* teaches that the electrical current expansion layer and the connection layer or electrode are applied directly to different layers. The person of skill would find no motivation in either Lee or *Udagawa* for applying the electrical current expansion layer and the connection layer or electrode directly to the same cladding layer. To suggest otherwise, as the Examiner has done in making his Section 103(a) rejection, is to improperly pick and choose selected parts of the reference structures to be combined based on impermissible hindsight reconstruction.

Applicants further note that neither *Lee* nor *Udagawa* addresses the issue addressed by and the functionality provided by the present invention -- i.e., less current injection into the region directly below the connection layer; no light or at least less light generation in this region; and therefore no light or at least less light consumption by the connection layer.

In view of the foregoing, the §103(a) rejection of claim 1 cannot properly stand and should be withdrawn.

Dependent Claims 2-26

Claims 2-26 depend, either directly or indirectly, from independent claim 1 and, as such, each is respectfully deemed to be allowable therewith.

These dependent claims moreover additionally include features which serve to still further distinguish the claimed invention over the prior art of record.

Conclusion

Based on all of the above, it is respectfully submitted that the present application is now in full and proper condition for allowance. Prompt and favorable action to this effect, and early passage of the application to issue, are respectfully solicited.

Should the Examiner have any comments, questions, suggestions or objections, the Examiner is respectfully requested to telephone the undersigned in order to facilitate a resolution of any outstanding issues.

Respectfully submitted,

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Dated: March 20, 2006